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ABSTRACT

The study reports on the first of several investigations into the antecedents and consequences of students' study activities across junior high school through college years. The development and validation of a self-report instrument, the "California Study Activities Inventory" (CSAI) is described. The principal features of the instrument include items designed to assess routine studying versus test preparation activities; cognitive versus self-management activities; and variations in activities associated with the cognitive transformational and volitional latitude requirements of particular courses. Volitional latitude refers to the degree of structure which characterizes a course. Along the dimension of transformational requirements, courses can be classified with respect to how much students must originate and carry out procedures for making connections among the elements of information to be learned. The CSAI is developed as a device for examining relationships among course characteristics, student characteristics, study activities, and achievement. Patterns of study activity selection and use, it was found, differed according to the cognitive transformational and volitional latitude requirements of classes. Significant differences in students' study activities were found by grade, with older students showing more diverse and more appropriate strategies, given demand conditions. Interactions between grade level and demand conditions were found for particular items.
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ASSESSMENT OF STUDY ACTIVITIES AS A FUNCTION OF DEMAND CONDITIONS

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ABSTRACT

Assessment of Study Activities as a Function of Demand Conditions

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April 1984

Despite its pervasiveness and apparent magnitude, very little is known about students' study activities. This paper reports on the first of several investigations into the antecedents and consequences of students' study activities across the junior-high school through college years. The development and validation of a self-report instrument, the "California Study Activities Inventory," is described. Its principal features include items designed to assess (a) routine studying vs. test preparation activities, (b) cognitive vs. self-management activities, and (c) variations in activities associated with the cognitive transformational and volitional latitude requirements of particular courses.

Results from a pilot test conducted on college students and on ninth and eleventh graders from schools selected as feeder schools for the college population revealed substantial support for the guiding hypotheses. Patterns of study activity selection and use differed according to the cognitive transformational and volitional latitude requirements of classes. Significant differences in students' study activities were found by grade, with older students showing more diverse and more appropriate strategies, given demand conditions. In addition, interactions between grade level and demand conditions were found for particular items.

There is a widespread recognition that, for one reason or another, large numbers of students are ill-prepared for the demands of college. One of the primary areas of student deficiency relates to self-directed learning activities, especially, managing the demands of courses and studying for examinations. Students increasingly arrive at college without the skills, habits, and dispositions necessary for sustained autonomous study. More specifically, students appear to lack the ability to consider priorities and set goals, to develop and follow a study plan and schedule, to employ study strategies that match course demands, and to manage their time effectively (The College Board, 1983).

To counter this trend, most colleges and many secondary schools have instituted programs to remediate or compensate for students' deficiencies. In addition, several attempts have been made to construct learning strategies curricula focused on study and self-management strategies and based on observation of good and poor students' activities (Anderson, 1979; Dansereau, 1978; McCombs, 1981; Weinstein, Underwood, Vicker, & Cubberly, 1979).

Despite such efforts, much additional work needs to be done. Research on learning and human abilities has focused on supervised tasks rather than on autonomous learning situations. As a consequence, there are some large and important gaps in what is known about the study-achievement relationship and its antecedents (Anderson & Armbruster, 1982; Rohwer, 1984; Thomas, 1980). Moreover, the majority of approaches to date have either been isolated investigations of particular study techniques such as notetaking or they have been attempts to define study skills or habits in aggregate fashion. In both research and test development studies, study activities have been described without reference to the course demands that instigate them, the expectations and intentions that guide students' efforts, or the environmental constraints that make up the school context.

Evidence of how little we know about study activities and their antecedents and consequences can be seen in the limited diagnostic utility of existing inventories of study "skills" or "strategies" (Weinstein, Schulte & Cascallar, 1983). In all instances, test development has been focused on the identification of omnibus abilities and attitudes that are presumed to operate uniformly across course contexts. Little attention has been paid to the apparent specificity of relationships among student characteristics, study demands, study activities, and achievement (Anderson & Armbruster, 1982; Rohwer, 1984). As Biggs (1976) warns:

> ...study processes are for the individual a fairly unique resolution of personality variables, attitudes, values, and motives on the one hand, and task and situational variables on the other. Hence, the basic irrelevance of courses in basic study skills in changing student study process...(p. 21)

The study presented here is a pilot project for a larger investigation that will test a family of hypotheses concerning the specificity of and changes in the study-achievement relationship during adolescence. Among the hypotheses to be tested is that as age and grade level increase, academic achievement is increasingly determined by students' study activity. According to the model (Thomas & Rohwer, 1982), displayed in Figure 1, this age-related trend stems from two sources: changes in course demands and changes in student characteristics.

Course demands that account for variance in study activities can be divided into two components associated with various courses: degree of volitional latitude and number of transformational requirements. Volitional latitude refers to the degree of structure which characterizes different courses, and, therefore, to the resultant range of opportunities they present for student-initiated (as contrasted with teacher-initiated) effort. Along the dimension of transformational requirements, courses can be classified with respect to how much students must originate and carry out procedures for making connections among the elements of information to be learned.

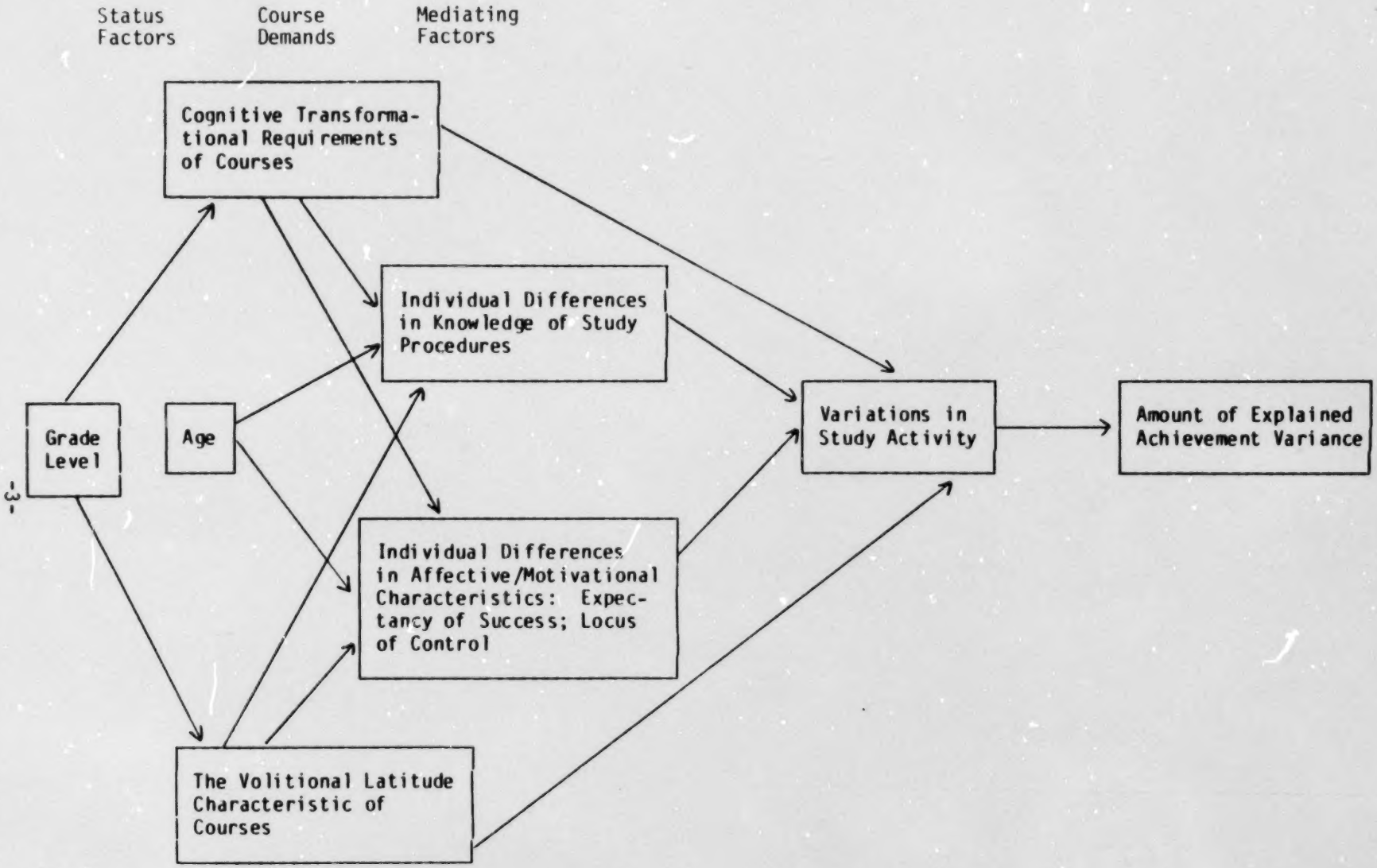
Status Factors
Course Demands
Mediating Factors
Cognitive Transformational Requirements of Courses
Individual Differences in Knowledge of Study Procedures
Grade Level
Age
Variations in Study Activity
Amount of Explained Achievement Variance
Individual Differences in Affective/Motivational Characteristics: Expectancy of Success; Locus of Control
The Volitional Latitude Characteristic of Courses

Figure 1 - A depiction of the possible interactions and relationships among status factors, student characteristics, context factors and study activity and achievement.

Variance in study activities is also attributable to two classes of individual difference factors which are hypothesized to mediate the effects of course demands. These classes of student factors are "cognitive transformational" and "self-management" capabilities, and include such factors as knowledge of study procedures, self-concept of academic ability, and locus of control.

The present study was initiated to fill the need for an instrument that is both comprehensive with respect to cognitive and self-management activities and responsive to the influence of course demands on study activities. As stated, the typical investigation of composite study activities aggregates scores across courses. According to the present hypotheses, this may explain some of the difficulties associated with currently available instruments (Rohwer, 1984; Weinstein, Schulte, & Cascallar, 1983).

There are two instruments that have been used widely to assess students' study-related behavior. The Survey of Study Habits and Attitudes (SSHA) (Brown & Holzman, 1967) is perhaps the most widely used survey instrument. Although correlations with GPA appear to be moderately positive, both its reliability and the dimensionality of its subscales appear to be in doubt (Bray, Maxwell, & Schmeck, 1980; Khan and Roberts, 1975). A second instrument, the Inventory of Learning Processes (ILP) (Schmeck, Ribich, & Ramanaiah, 1977) has somewhat better face validity than the SSHA. The ILP consists of fairly homogeneous items that assess study activities rather than attitudes. However, there is little evidence that the scale accounts for much variation in academic achievement.

A third, but as yet unpublished instrument, the Learning and Study Strategies Inventory (LASSI) (Weinstein, Schulte, & Cascallar, 1983) has features that make it more desirable for present purposes than these other instruments. As the authors point out, rather than using a correlational approach whereby items are selected according to how well they discriminate

between high and low achievers, the LASSI has been developed on more task-specific grounds. Items for the LASSI were selected for their utility as diagnostic measues of learners' strengths and weaknesses across a variety of typical school learning tasks. However, these items were generated from secondary sources--a survey of forty-seven study skills books, manuals, and program guides. And more important, no attempt was made to assess the differential use of study activities according to differences in course demands or conditions.

For present purposes, what seemed to be required was the development of an instrument that would: (1) be sensitive to the universe of study activities that might be required for a variety of study situations, study demands, and study subject matters; (2) focus on activities rather than on traits, abilities, or attitudes; and (3) include attention to both cognitive information-processing activities and self-management activities.

Design

This paper reports on initial steps in the process of developing, testing, and refining an inventory of students' study activities, the California Study Activities Inventory (CSAI). These initial steps are: Design of the test framework, Test development, and Field trial.

Design of the test framework. The framework for the CSAI grew out of the following considerations and requirements:

1. The inventory must be suitable for use with a wide age range of students: junior high school through college.

2. The inventory must be appropriate for a wide range of study contents.

3. This inventory must cover variations in study episodes, study demands, and phases of studying. The following distinctions have been drawn in each case:

a. Two study episode types:

1. routine studying during a course
2. preparing for an important examination

b. Two dimensions of study demands:

1. cognitive transformational demands
2. self-management demands

c. Three phases of study activities:

1. pre-study activities
2. on-task activities
3. meta-study activities

4. The inventory must include reference to the specific course requirements and contextual factors that are most influential in affecting students' differential use of study activities. These requirements and factors include at least the following:

a. Factors associated with routine study activities:

1. degree of (external) differentiation provided
2. source difficulty (cognitive complexity of learning materials)
3. specificity of study management guidance
4. valence of test events

b. Factors associated with test preparation activities:

1. degree of integration required for processing
2. degree of differentiation required
3. scarcity of rewards
4. degree of external support provided over (an extended) preparation period

Table 1 presents a taxonomy of dimensions and phases that was used to guide the classification and development of test items for the CSAI. Table 2 presents the classification of environmental indicators that were used to develop the format and general instructions for the CSAI. It is divided according to types of study episodes and types of requirements.

Test development. Individual test items were constructed as a result of three concurrent activities: inspection of extant tests and models of study processes; the generation of an extensive list of strategies, behaviors,

Table 1

Preliminary Model of the California Study Activities Inventory (CSAI)

	COGNITIVE TRANSFORMATIONAL DIMENSION	SELF-MANAGEMENT DIMENSION
PRE-STUDY ACTIVITIES	I. Differential Activities A. Seeks criterion information 1. Seeks information about target content 2. Seeks information about target performance type B. Comparatively evaluates (surveys) content elements 1. Surveys within sources 2. Surveys between sources C. Comparatively evaluates and selects study procedures 1. Selects procedure based on performance-type information 2. Selects procedures based on content information	I. Environmental Management Activities A. Establishes and maintains an environment conducive to studying 1. Secures necessary resources, materials; makes use of opportunities 2. Avoids and or deals effectively with distractions B. Plans for and manages study time effectively 1. Allocates a realistic portion of study time given demands and past performance 2. Plans for and carries out a manageable study schedule
ON-TASK ACTIVITIES	II. Processing Activities A. Selectively allocates attention 1. As a function of content-criterion relevance 2. As a function of content difficulty B. Follows procedures for preserving content (as required) 1. Uses verbatim preserving procedures, e.g., organization, elaboration for unrelated items; ordered rehearsal, chunking for sequences 2. Uses meaning-preserving procedures, e.g., selects medium to high order idea units, elaborates within-source corrections C. Follows procedures for integrating source information with other information 1. Integrates source information with prior knowledge, i.e., within course or extra-course 2. Elaborates applications (of source information) to within-course topics or topics from other domains--includes self-generated practice test items 3. Uses meaning-augmenting procedures, e.g., generates between source connections, reorganizes topics within and between sources	II. Behavioral Management Activities A. Provides self-direction for study-related behavior 1. Sets goals 2. Provides incentives 3. Exerts effort; persists B. Adapts behavior to fit requirements for effort 1. Keeps up-to-date and prepared 2. Keeps to schedule 3. Manages and selectively allocates level of concentration C. Establishes and manages positive study mood (including anxiety management, requirements for rest)
META-STUDY ACTIVITIES	III. Cognitive Monitoring Activities A. Tracks allocation of time and effort according to 1. Content-criterion relevance 2. Content difficulty 3. State of memory 4. Degree of comprehension B. Evaluates procedure effectiveness by self test 1. Evaluates verbatim-preserving procedures through self-test, e.g., verbatim reproduction 2. Evaluates meaning-preserving procedures for completeness and accuracy, e.g., paraphrasing 3. Evaluates degree of integration with other knowledge and/or ability to draw anticipated implications, applications, interpretations a. tests integration procedure used in studying, e.g., reorganizational capability, meaning augmented capability, applications capability b. test integration using a new procedure, e.g., test-like procedure	III. Volitional Monitoring Activities A. Tracks adequacy of environment, resources, and time B. Tracks adequacy of effort (intensity and amount) C. Tracks adequacy of procedures designed to keep "on track": maintenance of concentration, mood, efficiency

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Table 2

Taxonomy of Environmental Factors and Their Indicators Associated with Variation in Study Activities

		Factors	Indicators Associated with Extremes of Cognitive Transformational (Many-Few) and Volitional Latitude (High-Low)			
			Many-High	Many-Low	Few-High	Few-Low
Factors Associated with Routine Study Activities	Cognitive Transformational Requirements	1. Degree of (External) Differentiation Provided 2. Source Difficulty	Many • Lectures cover additional topics; they don't serve to differentiate readings. • Abstruse sources: unfamiliar, abstract, long sentences.	Many • Explicit warning that students are on their own. • Unorganized sources: no headings, no summaries.	Few • Lectures cover (differentiate) assigned readings. • Interpreted and concrete texts, e.g., with summaries.	Few • Teacher distributes outline of central issues. • Organized sources e.g., outline form, marginal interpretations.
	Volitional Latitude	1. Specificity of Study Management Guides Provided 2. Valence of Test Events	High • No requirement to turn in assignments; (no check on progress). • Tests are with major share of grade.	Low • Students must turn in notes periodically. • Tests are worth 50% of grade (no feedback).	High • Instructor never calls on students in class (no check on progress). • Tests are worth 100% of grade.	Low • Students called upon to recite from homework periodically. • Class participation counts 50% of grade.
Factors Associated with Test Preparation Activities	Cognitive Transformational Requirements	1. Degree of Integration Required for Processing 2. Degree of Differentiation Required	Many • Essay exam: students must integrate multiple treatments of subject area. • No differentiation; test covers all of course.	Many • Essay exam: students must compare and contrast topics, issues. • No differentiation; "you're on your own."	Few • Short answer test: students must match names with achievement. • Instructor provides list from which test items will be selected.	Few • Short answer test: students must put events in order. • Instructor reviews test items.
	Volitional Latitude	1. Scarcity of Rewards 2. Degree of External Support Provided Over Extended Preparation Period	High • Test is worth 80% of grade; test is graded on a curve. • 7 days; classes cancelled; explicit "you're on your own."	Low • Test is worth 40% of grade; pass-fail; most will pass; test can be retaken. • 7 days; mandatory attendance of study sessions; teacher coaching for study habits; (student initiated questions).	High • Test is worth major portion of grade; rigid, high, absolute standards; limits on high grades. • 7 days; last classes cover enrichment topics (not tested for); voluntary attendance.	Low • Test counts only if grade is higher than previous grades; absolute, low standards; expectation that most will pass; students can select among items. • 7 days; students divided into study groups for mandatory sessions; groups take turns guiding discussions.

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and decisions that could possible be involved in studying according to the collective wisdom of the test development team; and interviews with students from the target age range. A large list of items was reduced to a manageable number, mostly through checking for redundancies and through interviewing. Items that had little meaning or that reflected activities that are rarely engaged in were eliminated from the list. Finally, an attempt was made to achieve a reasonable balance among the six categories shown in Table 1.

Meanwhile, as the items were being refined, four "scenarios" were developed to be used to describe particular configurations of course and environmental conditions. A "scenario," in this case, was a single illustration containing pertinent information in the form of a dialogue balloon and a chalkboard. These four scenarios consisted of the four possible combinations of high and low cognitive transformational and self-management demands for each of the two types of study episodes: routine studying and test preparation. The particular indicators that were used to construct the scenarios can be seen in Table 2. For example, one such scenario used to introduce a set of questions concerning routine study activities involved the following general factors and specific indicators:

Factors	Indicators
1. Degree of (external) differentiation provided	"You will be responsible for reading three books... we won't have time to go over the books in class."
2. Source difficulty	"... the books are difficult, with unfamiliar abstract words and long complicated sentences."
3. Specificity of study management guidance provided	"No weekly assignments... you're on your own."
4. Valence of test events	"This exam will count for 100% of your grade."

Note that this combination is an example of HIGH cognitive transformational requirements (Factors 1 and 2) and HIGH volitional latitude (Factors 3 and 4). Scenarios were developed with as little extraneous information as possible, beyond what was necessary to describe attributes of the four factors. Attributes were selected for maximum contrast, compatibility, and comparability within and across factors.

Field trial. Once a preliminary version of the CSAI was developed, a field trial was conducted. That trial was carried out with two purposes in mind. First, as part of the development and validation process, we wanted data bearing on the item content and structural characteristics of the inventory. Second, we wanted to take an early look at the viability of certain general hypotheses concerning the influence of student and course characteristics on studying behavior.

Three issues concerning the instrument itself were addressed. First, we wanted to know if scenarios could serve as workable substitutes for actual course experiences. Since the CSAI is built on an assumption that study activities vary as a function of course characteristics, it was necessary to introduce items with reference to a specific course context. One way to do this is to have students respond to items about a course they are currently taking. Though this strategy helps ensure realism, it tends to confound student characteristics with course preference and makes comparisons across students and courses difficult. Hypothetical scenarios eliminate this bias at the possible expense of realism. Thus, an important evaluation question was to determine if students considered the scenarios to be realistic and memorable, and if the indicators have a lasting and consistent impact on student response to items.

Second, we wished to determine whether the categorical framework used to construct items is reflected in student response patterns. In particular, we were concerned that variations in response be associated with appropriate variations in course demands, as characterized in the scenarios. Self-management items should be influenced primarily by variations in volitional latitude, and only secondarily, if at all, by variations in cognitive demand. The reverse should be true for cognitive items.

Third, individual items and scenarios were examined for appropriateness of content, format, and language across the range of students taking the inventory. It is our intention to investigate the study activities exhibited by students from 8th grade through freshman year in college. To do so with the same instrument requires that the entire age range be able to understand and appreciate the scenarios and items in much the same way.

Two sets of hypotheses relating studying to student and course characteristics are being explored. The first of these concerns the relationship between grade level and study behaviors. We expect students in the upper grades to adapt their study activities more appropriately to variations in course structure than do students in the lower grades. Moreover, we expect to see a greater range of strategies utilized by older students in each of the six categories of activities in the inventory.

The second set of hypotheses have to do with the overall relationship between course structure and study behaviors. Overall, we expect to see a pattern whereby items selected to assess a particular type of study activity, such as differentiation or environmental management behaviors will be differentially influenced by different types of course conditions and demands. In these examples, differentiation activities should be influenced by the cognitive transformational requirements of a course whereas environmental

management behaviors should be influenced by volitional latitude conditions. More specifically, it should be possible to assess links between particular indicators of cognitive transformational and volitional latitude requirements and particular subclasses of cognitive and volitional study activities.

Finally, we hope to uncover individual patterns of response within grade level relative to social desirability and cue sensitivity. According to Miller and Parlett (1974), some students exhibit "cue seeking" behavior and should show varied behavior based on their reading of the scenarios. Other students may be "cue deaf," or in the present instance, "cue blind"; they may be genuinely unaware that information about course demands is available or useful.

Sample. A total of 199 students from seven schools participated in the project. Participants ranged from eighth-grade students through college freshmen and represented a moderate range of academic background. Students were drawn from the middle to upper-middle levels of achievement from one public junior high school, three public high schools, a private high school, a state college, and one state university.

Materials. Items were constructed to fit a consistent format. Each item was referenced to a particular course and often to a particular event in that course (e.g., "When studying for this test, I would memorize as many facts as possible"). Students responded by checking one of four alternatives (very likely, likely, unlikely, and very unlikely). Items were arranged in two sets--one set referring to routine study activities, the other to studying in preparation for an exam.

Nine forms of the CSAI were developed for use in this study. Each version entailed a different combination of scenarios and item sets. Three item sets (A, B and C) were constructed from the 130 items available for

testing. Versions A and B contained 75 and 73 items respectively. The 18 overlapping items were retained in both sets because of the relatively few items available in the two monitoring categories. Version C consisted of the full set of 130 items. (Each scenario had two parts, one for routine items and one for test preparation items.)

Versions A and B were then paired with each of the four types of scenarios. This pairing yielded a total of eight forms. Version C was paired with non-scenario instructions to make a total of nine forms. The instructions for the non-scenario version asked students to respond to items for a particular course they were currently taking.

After all nine forms were constructed, student packets were put together in the following manner. The four forms within version A and within version B were paired in all combinations (including counterbalancing for order) so that students would respond to the same set of questions for two different course conditions. A questionnaire accompanying the packet probed student reactions to the inventory, including their ability to utilize information from the scenarios. The non-scenario form (version C) was also accompanied by a questionnaire which focused on characteristics of the course on which the student had based his responses.

Method. There were a total of 24 different packets for the scenario versions of the CSAI (6 pairs X 2 orders X 2 versions). All combinations were assembled into bundles along with a small number of non-scenario versions. Test packets from these bundles were then randomly distributed to students within classes. Of the 199 students participating in the project, 92 took various forms of version A, 77 took various forms of version B, and 30 took the non-scenario version C. Table 3 shows a breakdown of particular patterns by scenario type.

Table 3

Distribution of Students by Test Version and Scenario

Test Version	Scenario Type: Few Many Low	Many High	Many Low	Few High	Total
Version A	25	25	23	19	92
Version B	19	22	16	20	77
Version C	Non-Scenario Version				30

Results

Only a portion of the total analysis will be presented here. Results are reported on the questions of principal interest: (1) the viability of assessing students' study activities using hypothetical contexts and self-report items; (2) the validity of that part of the model (Figure 1) that relates to the influence of task demands and course conditions on students' study activities; and (3) evidence of grade level differences in response patterns.

Viability of the test. Data on the workability and appropriateness of the test were collected by means of a questionnaire administered at the end of the testing session. Students were asked a series of "yes" or "no" questions concerning the distinctiveness of the scenarios.

Results of the total sample of students are shown in Table 4. Students apparently had little difficulty understanding and using the scenarios despite the fact that only about half the students reported having taken a course like the ones described in the scenarios. Roughly one-quarter of the students failed to use the scenario information to complete the questions, however. This result, combined with the finding that 33% of the students failed to see scenario #2 as distinct from scenario #1, presented something of a problem for subsequent analysis concerning the differential effect of scenarios.

Table 4

Summary of Student Responses to

Debriefing Questionnaire (N=169)

Question	Percentage Yes	Percentage No
1. Had a clear idea of course #1 while answering questions.	.90	.10
2. Had a clear idea of course #2 while answering questions.	.93	.07
3. Was necessary to go back and check facts about course #1 while answering questions.	.11	.89
4. Was necessary to go back and check facts about course #2 while answering questions.	.15	.85
5. Did not use information about course #1 while answering questions.	.27*	.71*
6. Did not use information about course #2 while answering questions.	.22*	.78*
7. Was able to distinguish between routine study situation and test preparation situation in answering questions.	.83*	.17*
8. Sometimes confused facts about course #2 with facts from course #1.	.17*	.82*
9. Saw course #2 as distinct from course #1.	.67*	.33*
10. Can imagine taking a course like course #1.	.79	.21
11. Can imagine taking a course like course #2.	.73	.27
12. Have taken a course like course #1.	.53*	.46*
13. Have taken a course like course #2.	.40*	.59*

* Percentage for students marking both "yes" and "no" is not reported.

Despite the questionable distinctness of the scenarios, it was the general conclusion of the test administrators that there were few workability problems with the test. There were no administration difficulties and students at all grade levels understood the directions and items. Post-administration interviews reinforced the finding that students understood what was expected of them and were able to carry out the instructions.

Validity of the model and test framework. The central question addressed in the study concerns the relative dependence of students' study activities on course demands. It was hypothesized that cognitive activities would be affected by the cognitive transformational requirements of courses and volitional activities would be affected by volitional latitude conditions characteristic of courses.

In order to test hypotheses about the effect of course demands, two overall contrasts were made, referred to hereafter as a Cognitive Contrast and a Volitional Contrast. The Cognitive Contrast consisted of a comparison between two of the four scenarios characterized as having many cognitive transformational requirements and the two scenarios with low cognitive transformational requirements. In like fashion, the Volitional Contrast consisted of a comparison between scenarios having high volitional latitude conditions and those having low volitional latitude conditions.

For each item, two 4 x 2 contingency tables were constructed: Four levels of response (very likely, likely, unlikely, and very unlikely) and two levels of each scenario dimension (many vs. few cognitive transformations and high vs. low volitional latitude). Kendall's tau, a measure of association, was calculated for the responses to each item for each dimension of the model. Given that a large number of conditions were met, results would be expected to show significant association of the cognitive items with the cognitive dimension.

Few if any of those items would be influenced by the volitional dimension. Similarly, volitional items would be affected by the volitional dimension but not the cognitive dimension. Among the conditions needed to result in such a pattern are:

1. Scenario fidelity. Scenarios would need to represent adequately the course experiences they were designed to describe. Not only would these descriptions need to be believable, they would also need to be memorable and compelling.

2. Item variability. Items would need to be constructed in a manner most sensitive to the dimension of interest. An item, for instance, which asks students if they adjust their learning strategies to the cognitive demands of a course would be answered in a uniform manner regardless of the particular course context in which the item was placed. However, an item asking the likelihood with which a particular strategy might be utilized may elicit varying responses depending on the particular task at hand.

3. Student sensitivity to course context. The model is constructed on the assumption that sensitivity to course demands is a characteristic of a sophisticated learner. A summing of student responses runs the risk of diluting effects characteristics of only a small number of students. While it is desirable to look for contrasts among student groups, certain limitations in the sample (only partial availability of achievement data, small sample size in subgroups) preclude certain systematic analyses of that sort.

4. Students capability and willingness to reflect accurately on their own study activities. The problems with self-report measures are well known. Responsible bias, self-deception, and even an honest lack of self-knowledge are all potential sources of error in self-report.

Results of the major analysis correspond only moderately, at best, to results expected if all of the aforementioned conditions were met. Of 93 cognitive items one would expect to find 4 or 5 to reach the .05 level of significance if there was no overall systematic effect for the cognitive dimension. In fact, 12 of those items had tau values significant at the .05 level (See Table 5.). Likewise, one would expect 2 or 3 of the 55 volitional items to reach that level of significance along the volitional dimension under a null hypothesis. In fact, 15 volitional items were found to be significant at the .05 level. Only 5 of the volitional items reached signficance along the

cognitive dimension. Yet, surprisingly, 14 of the cognitive items were found to be significant in the Volitional Contrast. Only 3 of those were the same items which had been signfiicant along the cognitive dimension.

Table 5

Overall Results for the Cognitive and Volitional Comparisons by Item Type

	Cognitive Contrasts Found to be Significant $p < .05$	Volitional Contrasts Found to be Significant $p < .05$	Total Contrast (Items)
Cognitive Items	12	14	93
Volitional Items	5	15	55

Certainly, the scenarios have some impact on student response. Enough significant relationships appear to discount the possibility that they are random occurrences. Yet, the effects most certainly are not as strong or as consistent, as may have been expected. One mediating factor is the extent to which students reacted to items based on scenarios in ways similar to the ways in which they would respond to the same items in the context of a course. Table 4 summarizes student responses to questionnaire items which followed the inventory. The majority of these items bear on student perceptions of the realism of the scenarios and their effects on item response.

Approximately 90% of the students reported having a clear idea of each course. Yet, a quarter of the students reported that they did not use scenario information and about one-third did not see the two scenarios they were given

as being distinct. Fewer than half reported having had a course like the one described in each case. To a certain extent, these responses may point to differences among students which are attributable to other sources than their ability to understand scenarios. For instance, some students who report not using scenario information also may not use information about the courses they are in in any meaningful adaptive fashion. Nonetheless responses to certain of these questions suggest that some attenuation can be expected in the apparent relationship between course structure and studying activities.

Items associated with significant contrasts on the cognitive or volitional dimensions. Table 6 displays the results shown in Table 5 broken down by item subsets. The number and percentage of significant contrasts is reported for subsets (see Table 1) of both the cognitive and volitional dimensions. Only volitional items were consistently more influenced by variations in course conditions hypothesized to influence volitional activity. Cognitive activities were as influenced by variations in cognitive transformational requirements as they were by volitional latitude conditions. Note the results for processing items. Eighty percent of the significant contrasts for cognitive processing items were found relative to variations in volitional latitude conditions.

Item analysis for the Cognitive Contrast. The Cognitive Contrast compares the two scenarios characterized by Many Cognitive Transformational Requirements to the two scenarios characterized by Few Cognitive Transformational Requirements. Table 7 presents tau values and levels of significance for the 17 items found to be significant, $p \leq .05$. In attempting to make sense of why these items were more sensitive to variations in a course's cognitive transformational requirements, it is useful to look separately at items tapping routine and test preparation activities.

Table 6

Number of Significant Cognitive and Volitional Contrasts by Item Type

Item Subsets		Total No. of Items	No./Percentage of Signif. Cognitive Contracts p ≤.05	No./Percentage of Signif. Volitional Contrasts p ≤.05
COGNITIVE				
Differentiation	A	13	2/.15	3/.23
	B	17	3/.18	1/.06
Processing	A	20	2/.10	7/.35
	B	19	1/.05	1/.05
Cog. Monit.	A	12	3/.25	2/.17
	B	12	1/.08	2/.17
VOLITIONAL				
Envir. Mgt.	A	11	2/.18	5/.45
	B	19	1/.05	2/.11
Behav. Mgt.	A	13	2/.15	5/.38
	B	8	0/.00	2/.25
Vol. Monit.	A	6	0/.00	1/.17
	B	6	0/.00	0/.00

Table 7

Items for Which There was a Difference Between Many and Few Cognitive Transformation Conditions ($p \leq .05$)

Item No.	Item Type	Item	Cognitive Contrast Tau Value	Signif. $p <$	Direction of Difference*
12A	Beh. Mgt.	I would complete all of the required reading for this course.	.31	.002	More Likely
9B	Cog. Mon.	For this course, I would check my class notes by comparing them with other students' notes.	.34	.003	More Likely
68A	Differ.	When studying for this test, I would have difficulty deciding how to study.	.28	.005	More Likely
44B	Differ.	While studying for this test, I would put extra effort on assigned readings that I had not competed, if any.	-.30	.01	Less Likely
33B	Differ.	Before starting to study, I would try to get more information about what this test will be like by asking students who have taken this course before from this teacher.	.26	.02	More Likely
45A	Differ.	While studying for this test, I would put extra effort on class notes.	.21	.02	More Likely
3A	Env. Mgt.	When I study for this course, I would make sure that I have with me all materials (books, notes, etc.) that I need.	.19	.03	More Likely
38A	Env. Mgt.	To help me decide what to study for this test, I would set a specific time period or periods to study for this test.	-.20	.04	Less Likely

*Response preference under increased cognitive demands.

Table 7 (continued)

Items for Which There was a Difference Between Many and Few Cognitive Transformation Conditions ($p \leq .05$)

Item No.	Item Type	Item	Cognitive Contrast Tau Value	Signif. p <	Direction of Difference*
39B	Env. Mgt.	When I began to study for the test, I would make sure that I had all of the notes, books, and other materials I will need.	-.20	.04	Less Likely
20B	Differ.	When doing the assigned reading for this course, I would make up a set of questions to help focus my reading.	.21	.05	More Likely
21B	Process.	When doing the assigned reading for this course, I would not use any special methods, just try to concentrate on what I'm reading.	-.21	.05	Less Likely
10A	Cog. Mon.	For this course, I would check my notes by comparing them with other students' notes.	-.19	.05	Less Likely
54A	Cog. Mon.	When reviewing for this test, I would review a page, then cover it and test myself.	-.19	.05	Less Likely
55A	Process.	When reviewing for this test, I would make up a song or rhyme to help remember the information.	-.19	.05	Less Likely
36A	Cog. Mon.	For this test, I would try to explain or describe the information to a friend.	-.19	.05	Less Likely
71A	Beh. Mgt.	When studying for this test, I would have trouble concentrating.	.19	.05	More Likely
53A	Process.	When reviewing for this test, I would work through examples in the book, if available.	.18	.05	More Likely

*Response preference under increased cognitive demands.

Routine activities. In situations where students must determine on their own what is important in a class and where the material to be studied is composed of difficult readings, students seem to be more likely to adopt activities that serve to differentiate important content (Items 20B, 9B, 21B) and to put increased effort on completing course work (12A).

Test preparation activities. The presence of high cognitive transformational requirements in the form of a high demand for information integration and a lack of information about what will be covered on a test leads, it appears, to increased appreciation of the cognitive challenge represented by these conditions (68A, 71A), increased use of high effort study aids (33B, 53A), and decreased use of routine or rote study strategies (38A, 44B, 55A, 71A).

The Cognitive Contrast revealed some inexplicable findings as well. Under cognitively demanding conditions, students are less apt to concern themselves with environmental management activities such as setting specific study periods and making sure that all resources are at hand than they are under less cognitively demanding conditions. It may be that highly demanding conditions are associated with all kinds of non-routine activities.

Item analysis for the Volitional Contrast. The Volitional Contrast compares the two scenarios characterized as being high in volitional latitude conditions to the two characterized as low in latitude. Table 8 presents tau values and levels of significance for the 31 items found to be significant, $p \leq .05$.

Routine activities. Scenarios were designed to contrast course situations where (a) students are free to manage their study behavior without supervision and (b) study-related performance (tests) is most important with situations where (a) study regimen is supervised and (b) test performance is worth only half the final grade. Given this contrast, students in the high

Table 8

Items for Which There was a Difference Between

High and Low Volitional Latitude Conditions ($p < .05$)

Item No.	Item Type	Item	Volitional Contrast Tau Value	Signif. $p <$	Direction of Difference*
73A	Beh. Mgt.	When studying for this test, I would put off studying until the last minutes.	-.38	.001	Less Likely
31A	Env. Mgt.	For this test, I would plan to do most of my studying well before the day of the exam.	.37	.001	More Likely
16B	Cog. Mon.	When doing the assigned reading for this course, I would make sure I understand things well before going on to the next assignment or reading.	-.37	.001	Less Likely
50A	Process.	When reviewing for this test, I would use flashcards.	.33	.002	More Likely
56A	Cog. Mon.	For this test, I would try to explain the information to a friend.	.33	.002	More Likely
20A	Process.	When doing the assigned reading for this course, I would make a chart or diagram.	.32	.002	More Likely
35A	Env. Mgt.	Before I began studying, I would skim the material and try to decide how much time I should set aside for studying each part.	.30	.005	More Likely
32A	Differ.	Before starting to study, I would try to get more information about what this test will be like by asking other students taking the course.	.27	.006	More Likely
67A	Vol. Mon.	While studying for a test like this one, I would try to keep track of time to make sure that I had enough time to do what I have to do.	.28	.007	More Likely
32B	Env. Mgt.	For this test, I would try to avoid conflicts with other activities or tests.	.29	.01	More Likely

*Response preference under increased volitional latitude.

Table 8 (continued)

Items for Which There was a Difference Between

High and Low Volitional Latitude Conditions ($p \leq .05$)

Item No.	Item Type	Item	Volitional Contrast Tau Value	Signif. p <	Direction of Difference*
4A	Beh. Mgt.	I would prepare for class meetings by reviewing my notes.	.25	.01	More Likely
25A	Differ.	When doing the assigned reading for this course, I would underline or note down all or most of the facts.	.25	.01	More Likely
66B	Env. Mgt.	While studying for a test like this one, I would have difficulty deciding how to divide up my time.	.27	.01	More Likely
39A	Env. Mgt.	Each time I studied for this test, I would have a clear idea of what I would try to get done during that session.	.24	.01	More Likely
59B	Cog. Mon.	While studying for this test, I would regularly check to see how well I was understanding what I was reading.	-.25	.02	Less Likely
6A	Env. Mgt.	I would use class discussions as an opportunity to ask questions about difficult material in this course.	.24	.02	More Likely
58A	Beh. Mgt.	When I sat down to study for this test, I would try to stick it out until I have satisfied myself that I knew the material.	.23	.02	More Likely
34A	Env. Mgt.	Before I started studying, I would skim through all of my books and notes to get an idea of what I have to cover.	.22	.02	More Likely
57A	Process.	When studying for this test, I would try to relate ideas from one topic to ideas on other topics.	.22	.02	More Likely
69B	Beh. Mgt.	When studying for this test, I would have trouble getting started with my studying.	.24	.03	More Likely

*Response preference under increased volitional latitude.

Table 8 (continued)

Items for Which There was a Difference Between

High and Low Volitional Latitude Conditions ($p \leq .05$)

Item No.	Item Type	Item	Volitional Contrast Tau Value	Signif. p <	Direction of Difference*
16A	Process.	When doing the assigned reading for this course, I would slow down and concentrate extra hard on the parts that I don't understand.	.20	.03	More Likely
68B	Beh. Mgt.	When studying for this test, I would get nervous.	.22	.04	More Likely
23A	Cog. Mon.	When doing the assigned reading for this course, I would make use of practice questions.	.21	.04	More Likely
49A	Process.	When reviewing for this test, I would read the material over and over.	.21	.04	More Likely
44A	Differ.	While studying for this test, I would put extra effort on topics that are most interesting.	-.19	.04	Less Likely
42A	Process.	While studying for this test, I would put extra effort on topics that I didn't understand.	.18	.04	More Likely
49B	Process.	When reviewing for this test, I would recopy my notes.	.21	.05	More Likely
6B	Differ.	During class meetings, I would listen carefully for clues about what I might be tested on in this course.	.20	.05	More Likely
47A	Process.	When reviewing for this test, I would use others' notes.	.19	.05	More Likely
71A	Beh. Mgt.	When studying for this test, I would have trouble concentrating.	-.18	.05	Less Likely
12A	Beh. Mgt.	I would complete all of the required reading for this course.	.17	.05	More Likely

*Response preference under increased volitional latitude.

volitional latitude versus low latitude conditions were more likely to use class discussions in a resourceful fashion (6A, 6B), to engage in "extra effort" study tasks (20A, 4A, 23A, 25A).

Test preparation activities. In the test preparation scenarios, high latitude courses were characterized as being highly competitive situations with no external support or guidance available. This is contrasted with permissive grading practices and generous study assistance in the low latitude courses. Given this contrast, students in the high volitional latitude conditions recognized the self-management challenge posed these circumstances and were more likely to evidence anxiety and motivational difficulties (66B, 69B, 68B). Accordingly, high latitude versus low latitude students seemed more likely to rise to the self-management challenge by adopting time management strategies (32B, 35A, 67A, 34A, 39A) and to begin their test preparation activities earlier (31A, 73A). Finally, students under high versus low latitude conditions were somewhat more likely to exhibit high effort cognitive strategies (42A, 47A, 49A, 50A, 56A, 57A) and to persist longer at study tasks (58A).

Again, there were a few puzzling findings. Under high latitude conditions students were less likely to try to understand things well before going on with their work, both in routine activities (16B) and in test preparation (59B), yet they would concentrate extra hard on parts that they didn't understand (16A).

Contrasts between grade levels. As important as aggregate patterns are, however, it is reasonable to expect that certain relationships based on grade differences may exist. A basic assumption of the model is that students will exhibit more varied and more appropriate studying behavior as they progress through school. Two analyses have been carried out to

explore that possibility. The first of these looks at the distribution of responses to items by grade level (tenth grade versus college freshmen and sophomores). The second, reported in the next section, examines the differential effects of grade level on the relationship between scenario dimensions and item response.

Overall, college students were more likely to exhibit the kinds of study activites surveyed in the CSAI. Using a level of signifiance of $p \leq .05$, 18 (25%) of the tau values for the 75 items in Version A of the test were significant, all but one showing this dominant pattern of a shift toward greater likelihood of occurrence. For example, Figure 2 shows a typical change in response pattern between high school and college. (Item 36 was used for this example.)

Item: To help me decide what to study for this test, I would make a list of topics the teacher spent the most time on in class.

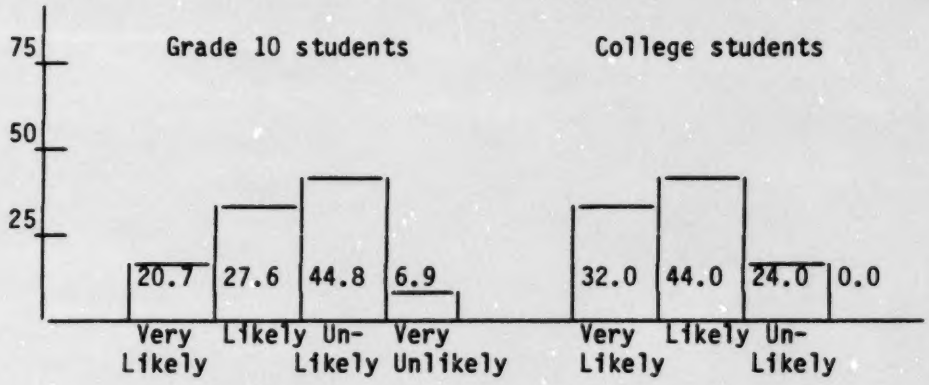

Figure 2 - Comparison of the distribution of high school and college responses to item 36.

As can be seen in this example, one aspect of the above mentioned pattern is that the modal response changes from "Unlikely" to "Likely" between high school and college. Other differences characteristic of the eighteen items that show a significant effect for grade is an increase in "Very

Likely" ratings and a decline in "Very Unlikely" responses between high school and college.

Overall, the change in pattern between high school and college is consistent with the view that college courses place more demands on students academically. However, college students are not more likely to engage in all kinds of study activities. These grade-related changes seem to center on four constructs. First, college students are more likely than high school students to employ high effort study aids such as student-generated outlines and summaries and are more apt to avail themselves of structured study aids such as review sessions.

A second construct that seems to link some of the significant grade-related changes in students' responses is increased planfulness. Older students are more likely to plan specific study times, to skim books and notes to get an idea of what to study in a study session, and to study with a mind to the kind of tests that might be required in a particular course. Related to planfulness is a third construct that might be labelled shrewdness. Older students seem more alert to the "game" of how to get good grades through studying. They are more apt to take more notes than usual when the instructor summarizes in a lecture and they are more likely to make a list of topics that the instructor spent the most time on in class as a means of differentiating items that might be on a test.

A fourth construct concerns their study activities while reading. Older students seem to be more sophisticated in the workings of memory. They are more likely to stop reading every so often to go over what has been learned, they are more likely to try to relate ideas from one topic to ideas on other topics, and they are less likely than younger students to try to memorize facts as a test preparation method.

Finally, older students are more likely to engage in team or group learning activities. Older students are more likely to study for a test by trying to explain or describe information to a friend and are more likely to study with one or more people than are younger students.

The effect of course demands as a function of grade level. An additional analysis was conducted in order to look at the differential impact of course requirements for high school students as compared to college students. Table 9 presents those items that were found to be significant ($p \leq .05$) for one or both grade levels in the contrast between scenarios with many cognitive transformations and few cognitive transformations. Positive tau values means that there was a significant positive correlation between the likelihood of the activity and the presence of many cognitive transformational requirements. Negative tau values signifies a negative correlation between cognitive requirements and the likelihood of the activity.

Findings of interest in Table 9 center on the items that were differentially influenced by course conditions for older but not younger students and items that showed a contrasting pattern for the two grade levels. Older students were more likely to use class discussions as a useful differentiation opportunity under stringent cognitive requirements than under less difficult demands. Older students were also less likely to engage in such activities as establishing set study times, comparing effort to other students, testing oneself for recall, and trying to make sense out of items to remember under demanding cognitive cognitions, which may reflect their recognition that these activities are best engaged in when the to-be-learned material is rote rather than meaningful.

Of even greater interest are the results for the two items that show opposite patterns for the effect of course conditions for high school versus

Table 9

Contrasts Between Many and Few Cognitive Transformational Requirements, High School versus College ($p \leq .05$ for one or both grades)

Item	Tenth Grade		College	
	Tau	Signif. level	Tau	Signif. level
Items that differentiated between conditions for younger, but not older students				
1. I would do some studying before each class meeting in this course.	-.43	.02	-.01	.49
3. When I study for this course, I would make sure that I have with me all the materials (books, notes, etc.) that I need.	.39	.01	.24	.10
69. When studying for this test, I would get lost in details and not pay enough attention to overall ideas or themes.	.38	.03	.28	.09
Items that differentiated between conditions for older, but not younger students				
6. I would use class discussions as an opportunity to ask questions about difficult material in this course.	-.06	.38	.38	.04
12. For this course, I would complete all of the required reading for this course.	.21	.13	.49	.01
29. In this course, I would compare my effort to that of other students.	.13	.27	-.40	.03
38. I would set a specific time period or periods to study for this test.	.13	.27	-.36	.04

Table 9 (continued)

Contrasts Between Many and Few Cognitive Transformational Requirements, High School versus College ($p \leq .05$ for one or both grades)

Item	Tenth Grade		College	
	Tau	Signif. level	Tau	Signif. level
Items that differentiated between conditions for older, but not younger students (continued)				
54. When reviewing for this test, I would review a page, then cover it and test myself.	.02	.45	-.56	.01
74. The more difficult something is to remember, the more I try to make sense of it.	.24	.09	-.38	.05
Items that showed contrasting patterns for different grade levels relative to course conditions				
27. Throughout the course, I would match my study methods to the kind of tests the instructor is likely to give.	-.42	.02	.35	.03
51. When reviewing for this test, I would use a method to help memorize the information, such as making up a story.	.37	.04	-.42	.03

college students. First, with regard to the use of memorization techniques, younger students were more likely to use such activities under conditions of high cognitive demand, whereas older students were more apt to employ memorization techniques under conditions of few cognitive requirements. One interpretation of this result is that, for younger students, difficult cognitive requirements elicits the use of study aids, but not appropriate ones. For older students, memorization techniques are more appropriately selected for less abstruse material.

A second finding in this category relates to item number 51. In this case, younger students were more likely to match their study method to the kind of test the instructor is likely to give under conditions of few cognitive demands. Older students were likely to match activities to possible testing strategies under more stringent cognitive requirements--a more sophisticated and appropriate strategy, at least under the scenario conditions presented in the CSAI.

Table 10 presents contrasts between high and low volitional latitude conditions that were significant ($p \leq .05$) for one or both grade levels, tenth grade versus college.

The results from this analysis, like other analyses for volitional latitude presented earlier, are less straightforward than for the cognitive contrasts. Again, positive tau values refer to positive correlations between the likelihood of an activity and, in this instance, high volitional latitude conditions. Negative tau values denote negative correlations between the likelihood of engaging in a particular activity and high volitional latitude conditions.

Younger students, under conditions of high versus low latitude, appear more apt to exhibit resourceful strategies that involve others (items 32, 47, 56) and test preparation strategies that involve a judicious use of time

Table 10

Contrasts Between High and Low Volitional Latitude Conditions,

High School versus College ($p \leq .05$ for one or both grades)

Item	Tenth Grade		College	
	Tau	Signif. level	Tau	Signif. level
Items that differentiated between conditions for younger, but not older students				
11. For this course, I would attend any review sessions.	-.40	.02	.13	.25
32. Before starting to study, I would try to get more information about what this test will be like by asking other students taking the course.	.46	.01	.32	.07
41. In preparing for this test, I would stop studying soon enough so that at exam time, I would not be too tired.	.42	.02	.27	.12
47. When reviewing for this test, I would use others' notes.	.36	.04	-.01	.48
56. When reviewing for this test, I would try to explain or describe the information to a friend.	.54	.003	.28	.09
67. While studying for a test like this one, I would try to keep track of time to make sure that I had enough time to do what I have to do.	.31	.05	.15	.24

Table 10

Contrasts Between High and Low Volitional Latitude Conditions,

High School versus College ($p \leq .05$ for one or both grades)

Item	Tenth Grade		College	
	Tau	Signif. level	Tau	Signif. level
Items that differentiated between conditions for older, but not younger students				
13. Each time I begin to study for this course, I would try to organize what I have to do so that I would use my time most efficiently.	.18	.18	.35	.05
15. When doing the assigned reading for this course, I would keep track of how well I understood each part.	.00	.49	.35	.05
17. When doing the assigned reading for this course, I would try to keep in mind what kind of tests might be required in this course.	-.10	.31	.35	.05
25. When doing the assigned reading for this course, I would underline or note down all or most of the facts.	-.28	.08	.41	.03
34. Before I started studying, I would skim through all of my books and notes to get an idea of what I have to cover.	.13	.25	.42	.02
40. I would start studying for this test when I was in the best mood to concentrate.	.00	.50	.44	.02

Table 10

Contrasts Between High and Low Volitional Latitude Conditions, High School versus College ($p \leq .05$ for one or both grades)

Item	Tenth Grade		College	
	Tau	Signif. level	Tau	Signif. level
Items that differentiated between conditions for older, but not younger students (continued)				
50. When reviewing for this test, I would use flash-cards.	.23	.13	.35	.05
71. When studying for this test, I would have trouble concentrating.	-.26	.10	-.37	.04
73. When studying for this test I would put off studying until the last minute.	-.30	.07	-.39	.04
74. The more difficult something is to remember, the more I try to make sense of it.	.04	.41	.41	.04
Items that differentiated between course conditions for both grade levels				
31. For this test, I would plan to do most of my studying well before the day of the exam.	.52	.01	.38	.05

(41, 67). Older students, under high versus low latitude conditions, appear to be more prone than younger students to adopt planful routine study strategies of the time management (13), cognitive monitoring (15, 17), and information processing (25) nature. With regard to test preparation activities, older students were more likely to exhibit activities that involve differentiation (34) and mood management (40, 71). Older students were less likely to put off studying until the last minute under high latitude conditions (74), although, according to item 31, both younger and older students report that, for routine study activities, they would be more likely to begin studying early under high latitude conditions.

Conclusion

The data reviewed in this paper are derived from a field study conducted as part of an instrument development process. The California Study Activities Inventory is being developed as a device for examining relationships among course characteristics, student characteristics, study activities, and achievement. A number of important assumptions about the nature of each of these variables has informed the design of the instrument, including the following.

1. Two dimensions of course variation are most apt to influence study activities: the cognitive requirements of the course and the relative emphasis placed on student self-management behaviors as a function of instructor-determined course structure (volitional latitude).

2. Study activities can be organized into a framework compatible with these course dimensions. That is, cognitive activities can be classified into: discriminating the relative importance of course topics, processing information, and monitoring cognition. Volitional activities can be classified into: environmental management, behavioral management, and self-monitoring.

Students from 8th grade to college were asked to indicate the likelihood with which they would engage in various cognitive and volitional

activities given a course description reflecting high or low values on the two primary course dimensions. Three analyses were carried out.

First, we examined overall response patterns to determine the general effects of course characteristics on student activies. Our purpose was to discover whether, as a whole, the students in our sample would report changes in study activities based on the volitional and cognitive dimensions of the hypothetical courses and whether those effects would support the linking of item types with course dimensions.

Second, we examined the distribution of responses to items by grade in order to see if there were overall differences in the strategies commonly employed at each level. Finally, we looked at the differential effects of grade level on the relationship between course characteristics and the likelihood that particular activities would be used.

Despite clear limitations on the dependability of data based on an instrument in progress, a number of interesting and suggestive results appeared. Overall effects of course dimensions on student responses were moderate at best. While it seems clear that course descriptions had an impact on significantly more items than would be expected by chance, only about one-third of the items overall were so affected. Moreover, while volitional items were, in general, appropriately influenced by the volitional dimension, nearly as many cognitive items were affected by volitional latitude conditions as by cognitive transformational requirements. Certain of these results fit quite comfortably into our model. For instance, where cognitive demands were high, students decreased the use of routine or rote study strategies. A few results appeared anomolous and difficult to account for. For example, under high latitude conditions, students were more likely to concentrate on difficult material on a routine basis, but were less likely to do so during test preparation.

Analyses by grade afforded a richer and more interesting picture. Clear differences between college students and tenth graders existed, both in the sorts of activities they favored and in the ways in which these activities were influenced by course characteristics. College students were more likely overall to utilize a variety of cognitive strategies, to be more planful in setting study schedules, and more attentive to information that might help them predict what was going to be on a test. In addition, the utilization of these and other strategies was more clearly appropriate to the assumed course conditions. Tenth graders, for instance, indicated a greater likelihood for using memorization strategies on material that placed a high demand for cognitive integration than with material of a more list-like character. College students showed just the opposite pattern. Similarly, younger students indicated greater attention paid to linking study strategies to the kind of test an instructor is likely to give when cognitive demands are low. Older students pursue this goal more attentively when demands are high.

Additional analyses remain to be done with the current data set. Following that will be a major revision of the test framework derived from the model. While there is a great deal yet to be accomplished on the refinement of both the model and the inventory, we believe that the fundamental hypotheses relating course and student characteristics to study activities are sound. Studying is a complex area. Study behaviors are not simply skills or habits that students reflexively apply whenever they are on their own, regardless of conditions and expectations. Study activities appear to be more like coping strategies that students, at least most students, bring to bear to meet the particular demands of a course. Next steps in the larger study will be to investigate the mediating influence of such student characteristics

as achievement orientation and expectation of success on the engagement of study activities under different conditions.

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